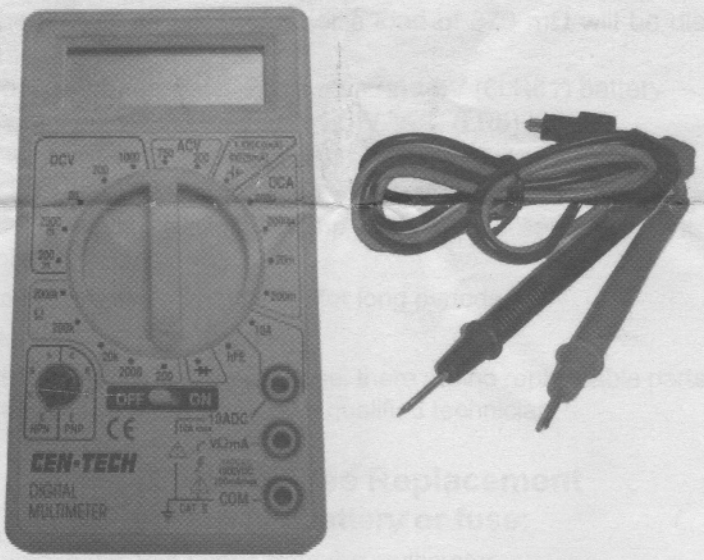
CEN-TECH®

7 FUNCTION DIGITAL MULTIMETER

Model 90899

OPERATING INSTRUCTIONS



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REV 12a

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For technical questions and replacement parts, please call 1-800-444-3353

Specifications

Frequency	45-450 Hz
DC Amps	Ranges: 200µA/2000µA/20mA/200mA, 10A
Accuracy	(@200µA-200mA) 1.2%±2D; (@10A) 3%±2D
DC Voltage	Ranges: 200mV/2000mV/20/200/1000V
Accuracy	(@200mV) 0.5%±1D; (@2000mV-200V) 1.0%±1D; (@1000V) 1.0%±2D
AC Voltage	Ranges: 200/750V
Accuracy	(45-450 Hz) 1.2%±10D
Resistance	Ranges: 200/2000/20K/200K/2000K Ohm
Accuracy	(@200-200K Ohm) 0.8%±2D; (@2000K Ohm) 1.0%±2D;
Sampling Rate	2.5 times/Second
Overload Protection	Fast-Acting 500mA/250V Fuse
Operating Temperature	Range: 32° - 104° F
Display	$^1/_2$" high 3-$^1/_2$-digit LCD
Battery	One 9 V (included)
Weight	.45 lb.
Features	29-1/2" Test Leads, Transistor (NPN and PNP) Testing Function, Battery Testing Function, and Automatic Polarity and Zero Adjust

Save This Manual

You will need the manual for the safety warnings and precautions, and operating and maintenance procedures. Keep your invoice with this manual. Write the invoice number on the inside of the front cover. Keep the manual and invoice in a safe and dry place for future reference.

Safety Warnings and Precautions

WARNING: When using tool, basic safety precautions should always be followed to reduce the risk of personal injury and damage to equipment.

Warnings continued on page 3.

Read all instructions before using this tester!

1. **Avoid working alone**. If an accident happens, an assistant can bring help.
2. **Keep work area clean**. Cluttered areas invite injuries.
3. **Avoid electrical shock.** Use extreme caution when using this tool near uninsulated conductors or bus bars. Prevent body contact with grounded surfaces such as pipes, radiators, ranges, and cabinet enclosures when testing voltages.
4. **Avoid damaging meter**. Use only as specified in this manual.
5. **Observe work area conditions**. Do not test voltages in damp or wet locations. Don't expose to rain. Keep work area well lit.
6. **Keep children away**. Children must never be allowed in the work area. Do not let them handle machines, tools, or extension cords.
7. **Store idle equipment**. When not in use, tools must be stored in a dry location to inhibit rust. Always lock up tools and keep out of reach of children.
8. **Dress properly**. Do not wear loose clothing or jewelry as they can be caught in moving parts. Protective, electrically nonconductive clothes and nonskid footwear are recommended when working. Wear restrictive hair covering to contain long hair.
9. **Use eye protection**. Always wear ANSI approved impact safety goggles.
10. **Do not overreach**. Keep proper footing and balance at all times. Do not reach over or across electrical cables or frames.
11. **Maintain tools with care**. Ensure multimeter has a fresh battery. Inspect test leads periodically and, if damaged, have them repaired by an authorized technician.
12. **Stay alert**. Watch what you are doing, use common sense. Do not operate any tool when you are tired.
13. **Check for damaged parts**. Before using any tool, any part that appears damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for any broken parts and any other condition that may affect proper operation. Any part that is damaged should be properly repaired or replaced by a qualified technician. Do not use the tool if any switch does not operate properly.

15. **Replacement parts and accessories**. When servicing, use only identical replacement parts. Use of any other parts will void the warranty. Only use accessories intended for use with this tool. Approved accessories are available from Harbor Freight Tools.

16. **Do not operate tool if under the influence of alcohol or drugs**. Read warning labels on prescriptions to determine if your judgment or reflexes are impaired while taking drugs. If there is any doubt, do not operate the tool.

17. **We recommend that only a licensed electrician work on high-voltage or other potentially dangerous circuits.**

Note: Performance of this tool may vary depending on condition of internal battery.

Warning: The warnings, cautions, and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.

Warning: This product contains or produces chemicals, including lead, known to the State of California to cause cancer and birth defects (or other reproductive harm).
(California Health & Safety Code 25249.5 et seq.)

Unpacking

When unpacking, make sure the following parts are included: Digital Multimeter, and black and red Test Leads. If any parts are missing or broken, please call Harbor Freight Tools at the number on the cover of this manual. If any part of the machine is missing or broken, please call Harbor Freight Tools at the number on the front cover as soon as possible.

Operation

WARNING: ELECTRICAL SHOCK CAN CAUSE DEATH OR INJURY. AVOID TOUCHING EXPOSED CONDUCTORS OF ELECTRICITY.

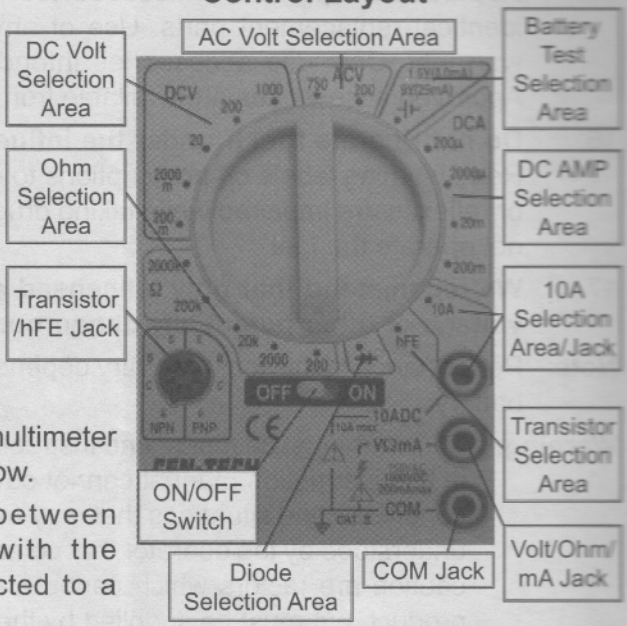
Additional Multimeter Precautions

1. Do not test voltage on AC circuits higher than 750 volts.
2. Do not test voltage on DC circuits higher than 1000 volts.
3. Do not test current on circuits higher than 10 amps.

4. Be careful not to apply voltage to the Test Leads when they are connected to the COM (Bottom) and VΩmA (Center) Jacks and the Multimeter is in an Ohms testing setting. Damage can occur to the multimeter or the fuse may blow.

5. Do not switch between testing modes with the multimeter connected to a circuit.

Control Layout



AC Voltage Measurements

Measure AC conductors carrying up to 750 VAC, 45-450 Hz.

1. Turn the Range Selector Switch to 750 ACV setting.

   Always start with the highest range if the voltage is unknown.

2. Plug the red lead into the VΩmA (Center) Jack. Plug the black lead into the COM (Bottom) Jack. Switch the Multimeter ON.

3. Carefully touch the exposed conductors with the tips of the probes to measure the voltage (not amperes).

4. Read measurement.

   If the voltage is less than 200 volts, set the Range Selector Switch to the lower range.

5. When testing is complete, remove Test Leads and store with multimeter.

DC Voltage Measurements

Measure DC conductors carrying up to 1000 VDC.

1. Turn the Range Selector Switch to 1000 DCV setting.

2. Follow the directions above under "AC Voltage Measurements", only use the DC settings instead.

DC Current Measurements

Measure DC conductors carrying up to 10 amperes.

1. Turn the Range Selector Switch to the 10A position.
   Always start with the highest range if the amperage is unknown.
2. Plug the red lead into the 10A (Top) Jack. Plug the black lead into the COM (Bottom) Jack. Switch the Multimeter ON.
3. Carefully touch the exposed conductors with the tips of the probes to measure the amperage.

Note: Amperage is always tested in series with the circuit under test.

4. Read measurement.
   If the reading is less than .2 AMPs, switch the red lead to the VΩmA (Center) Jack and set the Range Selector Switch to the 200 mA setting.
5. When testing is complete, remove Test Leads and store with multimeter.

Resistance Measurements

Measure circuit resistance up to 2000K Ohms.

WARNING: NEVER measure resistance on a circuit with voltage running through it.

1. Turn the Range Selector Switch to the 200 mA position.
2. Plug the red Test Lead into the VΩmA (Center) Jack. Plug the black Test Lead into the Com (Bottom) Jack. Switch the Multimeter ON.
   Short the Test Leads together. The meter should read "0" Ohms.
3. Touch the exposed conductors with the tips of the Test Leads.
4. Read measurement.
   If the reading is "1", set the Range Selector Switch to the next higher Ohm (Ω) position.

Transistor (hFE) Measurements

Test transistors to ensure proper function.

1. Turn the Range Selector Switch to the hFE position.
   Switch the Multimeter ON.
2. Insert the transistor pins into the appropriate hFE jack (NPN or PNP) according to the EBC (Emitter, Base, Collector) sequence.
3. The meter will show the approximate hFE value.

Diode Measurement

Test the voltage drop in diodes.

1. Turn the Range Selector Switch to the Diode (→|) position.
2. Plug the red Test Lead into the VΩmA (Center) Jack. Plug the black Test Lead into the Com (Bottom) Jack. Switch the Multimeter ON.
3. Connect the red probe to the anode of the diode and the black to the cathode.

4. The approximate forward voltage drop of the diode will be displayed in mV. If the connection is reversed only "1" will be shown.

Battery Charge Measurement

Test the amount of charge left in batteries.

NOTE: This setting is for testing the charge of small 9V or 1.5V batteries only. Never use this setting to test automotive or lead-acid batteries. The high current could cause damage to the meter and/or cause severe personal injury. Use the appropriate DC Voltage setting to test the open current voltage of such batteries instead.

1. Turn the Range Selector Switch to the Battery (⊣⊢) position.
2. Plug the red Test Lead into the VΩmA (Center) Jack. Plug the black Test Lead into the Com (Bottom) Jack. Switch the Multimeter ON.
3. Connect the red probe to the positive terminal of the battery and the black to the negative terminal.
4. The battery amperage under a load of 370 mΩ will be displayed to a resolution of .1mA.
5. Normal amperage: For a standard 9V (6LR61) battery = 25 mA
   For a 1.5 V "AA" (LR6) battery = 4 mA

Maintenance

1. Wipe unit with a slightly damp cloth using a light detergent. Do not use solvents or abrasives.
2. Remove battery if not in use for long periods.
3. Store unit in a dry location.
4. Other than the battery and fuse, there are no replaceable parts on this unit. Repairs should be done by a qualified technician.

Battery/Fuse Replacement

To replace the battery or fuse:

1. Remove the Test Leads from the multimeter.
2. Turn the unit over.
3. Remove both screws using a cross head screwdriver.
4. Remove back cover.
5. Pull battery/fuse out of unit and replace with the same. (9V battery or 500mA/250V fast-acting fuse)
6. Replace cover and retighten screws.

NOTE: No replacement parts are available for this tool.